CALCULATIVE RATE OF INTEREST AND CAPITAL NEED

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Asset demand is the profit to be expected from the value of ***fixed assets engrossed*** and used permanently in entrepreneurial activities, often called ***calculative rate of interest*** in the technical literature since ***profitability expectations*** are calculated in practice.
However, the ***profitability expectations*** (asset demand) calculated after an entrepreneurial activity is not arbitrary since it is determined ***objectively by economic factors*** of the given time period and ***subjectively*** by the profit requirements of entrepreneurs. The dimension of the objective asset demand is specified by the asset demands charged for ***own resources*** and ***foreign capital***. Subjective asset demands are, on the one hand, the asset demands charged for the excess work of production, organization, direction and control (top managerial) that come with ***entrepreneurial activities*** and, on the other hand, the asset demands deriving from taking the ***risks*** of production.
The ***minimum of asset demand*** expected from engrossed asset value originating from ***own resources*** can be equal to the safe and theoretically ***risk-free state bond market benchmark***. A business enterprise can reach this profitability return on capital or asset level without productive or service activities if it invests its money permanently in long-term state bonds. The r***ealistic assessment of engrossed capital*** can be conceived by the effective operation of the capital market. The ***stock exchange*** is a unique market where the relatively objective assessment of engrossed capitals can be realized. The reason to this is simple, a concentrated market can best meet the conditions of the perfect competition (a lot of vendors and customers, rapid information flow, price-taking attitude by the acting parties, freedom to enter or leave the market.)
If we take the assumption of microeconomics as a starting point saying; within competitive market conditions the economic profit will become eliminated in the long run (zero economic profit hypothesis) then, eventually, this means that the risk-free long term state bounds' yields must converge to the average net income in a given economy – namely to the ***normal profit***'s value.
It is theoretically simple to determine the ***asset demand charged for foreign capital*** since the ***price of foreign capital use*** can be considered to be equal to the ***interest received on credit***. The problem is that ***interest rates*** of foreign capitals offered by trade banks are ***not unified*** and we have to consider the ***administrative costs*** which are often not insignificant. The problem can be somewhat surmounted by calculating with the ***weighted average of the rates of interests*** of the ***credits*** taken while taking into account all further costs of taking up foreign capital. Consequently, it would not be right for a business enterprise to consider the yield rate of the investment that can be reached risk-free as the price of capital use of foreign capitals.
As already mentioned, subjective profitability expectations have two elements, one of which is the ***expected profit of entrepreneurial activities***. The business enterprise is free to decide about the percentage and the charge of this. It is useful to determine entrepreneurial asset demands based on the ***average risk conditions*** of the given branch, which provides the entrepreneur a part of the necessary resources to make further innovations efficiently. It does not mean that entrepreneurial asset demand has to completely cover the overall resources needed for innovation but that an ***innovation benefit*** has to be created at the producer that does not hinder or block developmental leaps in time. Entrepreneurial asset demand has to be

charged both for equity and foreign capital since a company using foreign capital is a ***secondary risk taker*** in the production process. (The price of foreign capital use, the interest rate on credit, is higher then the benchmark of risk free state bonds because the owner of the foreign capital, the creditor, builds the price of its own risk into the rate of interest on credit).
The other element of the subjective asset demand is the ***asset demand on risk***. The asset demand on risk is a ***yield expectation*** that entrepreneurs have to take into consideration in the case of risks exceeding the average (excess risk). In other words if an activity meets the requirements of higher profitability than it is more likely to achieve the yield expectation determined for average risks. The raising of the calculative interest rate, as the method of risk handling in economic calculations, is a long known method in the practice of business economics. A lot of emphasis has been put on the raising and complementing of entrepreneurial asset demand by the beta index. The asset demand on risk has to and can be charged for the equity locked up in the production permanently by the entrepreneur.
In table 1 we may see the method of calculating profitability expectations derived as ***calculative rate of interest*** for ***different equity-foreign capital*** rates. We calculate with the ***10 years state bond benchmark*** after the equity locked up in the activity since we did our calculation in the case of a technology used for 10 years. We estimated the price of foreign capital use by the average ***rate of interest of credit*** of banks. We calculated the entrepreneurial asset demand with ***re-investment benefit of 5%*** in the case of ***average risk*** while we took the ***excess risk*** of the assumed management by a ***beta index of 1,3***. The amount of t***he asset demand calculated for a total lockup capital*** – interpreted as the sum of the state bond benchmark weighted by the percentage of the capital portfolio of the business enterprise, the rate of interest and of the subjective asset demands – slightly differed seen from the normal rate of indebtedness of 20-40%. We found values of ***14.8-16.3% for profitability expectations*** on permanently lockup capitals in production.
The universally expected ***managerial principle*** during the operation of a business enterprise is the ***return demand*** on a short and long scale as well. The ***depriciation resource*** created by permanent lockup capital as well as the ***asset demand*** deriving from the production process backed up by the actual capital portfolio can be interpreted as parts of the return demand. The estimated values of the resource elements providing return demand are shown in table 2 by the composed calculation. The amount of the depriciation income, that is the value of the implicit costs charged for permanent lockup capital, was determined by the ***linear depriciation on gross value method***. We created the percentage of the asset demand by calculating the ***amortization factor*** value for the estimated asset demands in table 1 assuming a 10 years capital amortization and from this value we subtracted one hundredth of the linear depriciation key on gross value. (The amortization factor signals the amount of invest-able money resulting from a unit of the capital in an economic period so that the invested amount returns in the given period and the capital increase according to the time preference). According to the previously outlined economy model an approximately 15,5 % profit expect in a 10 years technological period using a time proportional lineal amortization the gross value of slightly more than 10% should also be counted as part of the profit requirement.
We carried out the usual ***investment-return calculation*** with the help of the operational capital resource. The elements of the operational capital resource (depriciation income, estimated asset demand) serve to provide the ***return on the lockup capital*** and to create a source that is enough for the enterprise to make its ***innovations***. We composed the investment-return calculations on three different levels of profitability which are analyzed in tables 3-5. We considered – with the help of the calculative interest rate - the asset demand of 10.5% ***average profitability*** with an equity – foreign capital rate of 70:30. A 50% higher value was considered to be ***highly profitable*** (15%). Finally, we took the profitability level on

which the operational capital resource just enables the real value of the lockup capital to be returned (1.8%) as the basis of ***low profitability*** while the investment price index was 3%.
The results of the calculations show that we can calculate with ***5-6 years of return*** on lockup capitals used for ten years when the profitability on capital is average or high while the ***return rate of investment is 1.7-2.1.***
The data of table 5 show that a capital profitability of 1.8% does not result in the creation of any innovation resource that is why we call this profitability level the ***"limit of innovation benefit creation"***. This means that in our economic model, in the case of 1.8% capital profitability, we have to spend all our net income created nominally on ***maintaining the real value of our depriciation-side resources***. From these we may draw the conclusion that a business enterprise of low level of profitability is very unlikely to create such innovation resource mass that could provide the firm with hindrance-free innovation activities.
After carrying out the investment-return calculations for different capital profitability levels, we determined the ***capital demand mass*** that results in a ***net income of 5 million HUF*** when the ***asset demand*** is ***average***. Since we put up business enterprise orienting on profit an producing products or services for an uncertain period of time the permanent capital lockup of expected amounts was determined by the ***over-capitalization*** of the average asset demand of 5 million HUF (debenture formula). The capital need tuned out to be ***48 million HUF*** based on which we calculated the amount of developmental resource available for the firm at some profitability levels(Table 6).
Results show that if the ***equity-foreign capital rate is 70:30*** and the ***average capital profitability*** is 10.5%, a ***re-investment benefit of 3,400,000 HUF*** is created, the accumulated value of which covers more than 50% of the investment value of the new technology. This means that the investment object can be ***safely financed*** from ***mixed resources*** (depriciation resource, profit resource, credit resource) after ten years making long-term operation maintainable.

References

(1) Udovecz G. (2000): Jövedelemhiány és versenykényszer a magyar mezőgazdaságban. (Lack of income and competition coercion in Hungarian agriculture). Agrárgazdasági Tanulmányok 2000. 1.sz. AkII. (11-12.p.)-(2) Kopányi M. (2004): Mikroökonómia. (Microeconomics). BKE. Műszaki Könyvkiadó, Budapest (418-420. p.)-(3) Illés M. (2008): Vezetői gazdaságtan. (Managerial economics). Kossuth Kiadó, Budapest-(4) McMahon G. P. Richard (1985): How to Understand Financial Information? Business Information Review. 2. (15-21. p.), (5) Hal R. Varian (1999): Intermediate Microeconomics. W:W. Norton&Company, New York, London

Profitability expectation[1]
(asset demand in the case of 10 years capital lockup)

Unit:% Table 1

The rate of equity and foreign capital	on equity[2] (r_{10}=7,00%)	on foreign capital[3] (r_h=15,5%)	Entrepreneurial asset demand[4] (r_v=5,0%)	Venture asset demand[5] (r_k=1,5%)	on all lockup capital
80:20	5.6	3.0	5.0	1.2	14.8
70:30	4.9	4.7	5.0	1.1	15.7
60:40	4.2	6.2	5.0	0.9	16.3

[1] profitability return on equity
[2]10 years state bond market benchmark
[3] the price of foreign capital use
[4]average entrepreneurial asset demand
[5] venture asset demand(β= 1.3)
Source: Own calculations 2011

The estimated value of the elements of return demand[1]

Unit:% Table 2

The rate of equity and foreign capital	Return demand		Total profit demand
	Depriciation income[2]	Asset demand[3]	
80:20 (q_{10}=0.1977)	10.0	9.8	19.8
70:30 (q_{10}=0.2046)	10.0	10.5	20.5
60:40 (q_{10}=0.2092)	10.0	10.9	20.9

[1]10 years of duration, in the case of linear depriciation on gross value
[2]amortization depriciation key
[3]gross asset demand on value
Source: Own calculations 2011

Investment-return calculation[1] from operational capital resource (in the case of average profitability |10,5%|)

Unit:% Table 3

Years (n)	Depriciation income	Estimated income	Operational capital source	Df[2]	Present value of operational capital resource	Cumulative operational capital resource[3]
1.	10. 0	10.5	20.5	0.9709	19.9	19.9
2.	10. 0	10.5	20.5	0.9426	19.3	39.2
3.	10. 0	10.5	20.5	0.9151	18.8	58.0
4.	10. 0	10.5	20.5	0.8885	18.2	76.2
5.	10. 0	10.5	20.5	0.8626	17.7	93.5
6.	10. 0	10.5	20.5	0.8375	17.2	**111.1**
7.	10. 0	10.5	20.5	0.8131	16.7	127.8
8.	10. 0	10.5	20.5	0.7894	16.2	144.0
9.	10. 0	10.5	20.5	0.7664	15.7	159.7
10.	10. 0	10.5	20.5	0.7441	15.3	175.0
Total	100. 0	105.0	205.0	-	175.0	-

[1]with a ratio of 70:30 of equity and foreign capital
[2] calculated by 3% of investment price index
[3]M_D = 5.4 year ; BF_D = 1.7
Source: Own calculations 2011

Investment-return calculation[1] from operational capital resource (in the case of high profitability |15%|)

Unit:% Table 4

Years (n)	Depriciation income	Estimated income	Operational capital source	Df[2]	Present value of operational capital resource	Cumulative operational capital resource[3]
1.	10.0	15.0	25.0	0.9709	24.3	24.3
2.	10.0	15.0	25.0	0.9426	23.6	47.9
3.	10.0	15.0	25.0	0.9151	22.9	70.8
4.	10.0	15.0	25.0	0.8885	22.2	93.0
5.	10.0	15.0	25.0	0.8626	21.6	**114.6**
6.	10.0	15.0	25.0	0.8375	20.9	135.5
7.	10.0	15.0	25.0	0.8131	20.3	155.8
8.	10.0	15.0	25.0	0.7894	19.7	175.5
9.	10.0	15.0	25.0	0.7664	19.2	194.7
10.	10.0	15.0	25.0	0.7441	18.6	213.3
Total	100.0	150.0	250.0	-		-

[1] with a ratio of 70:30 of equity and foreign capital
[2] calculated by 3% of investment price index
[3]M_D = 4.4 year ; BF_D = 2.1
Source: Own calculations 2011

The limit of innovation benefit creation (in the case of low profitability |1,8%|)

Unit:% Table 5

Years (n)	Depriciation income	Estimated income	Operational capital source	Df	Present value of operational capital resource	Cumulative operational capital resource[3]
1.	10.0	1.8	11.8	0.9709	11.5	11.5
2.	10.0	1.8	11.8	0.9426	11.1	22.6
3.	10.0	1.8	11.8	0.9151	10.8	33.4
4.	10.0	1.8	11.8	0.8885	10.5	43.9
5.	10.0	1.8	11.8	0.8626	10.2	54.1
6.	10.0	1.8	11.8	0.8375	9.9	64.0
7.	10.0	1.8	11.8	0.8131	9.6	73.6
8.	10.0	1.8	11.8	0.7894	9.3	82.9
9.	10.0	1.8	11.8	0.7664	9.0	91.9
10.	10.0	1.8	11.8	0.7441	8.8	100.7
Total	**100.0**	**18.0**	**118.0**	**-**	**100.7**	**-**

[1] with a ratio of 70:30 of equity and foreign capital
[2] calculated by 3% of investment price index
[3] M_D = 9.9 year ; BF_D = 1.0
Source: Own calculations 2011

Capital need and available source for development (in case of different profitability)

Table 6

Name	Unit	1.8%	10.5%	15.0%
		Profitability on capital		
Capital need [1] (PV = 5000/0,081)	thousand HUF	48.000		
Net income[2]	thousand HUF/year	864	5040.0	7200.0
profits tax (16%)	%	138.2	806.4	1152.0
Available source for development	thousand HUF/year	725.8	4233.6	6048.0
Innovation benefit[3]	thousand HUF/year	-138.2	3369.6	5184.0

[1] in case of average asset demand (10.5%), assuming an annual income of 5 million HUF
[2] the net income corresponds with the result before tax used in accountancy
[3] in case of average asset demand (10.5%) the development can be insured (the estimated value of new technology= $1.03^{10} \times 48 = 64.5$ mill HUF)
Source: Own calculations 2011